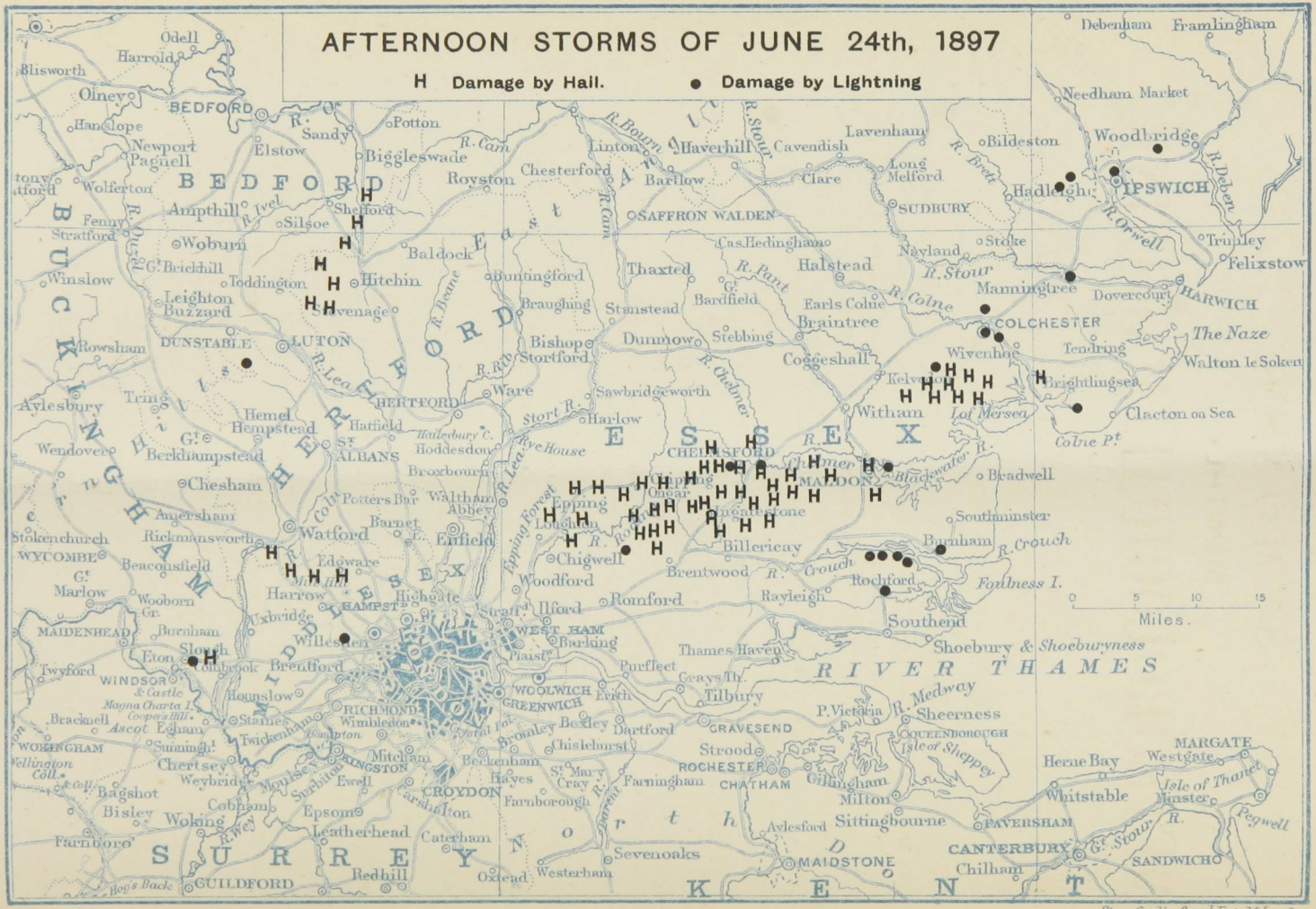
AFTERNOON STORMS OF JUNE 24th, 1897
H Damage by Hail.
● Damage by Lightning
BEDFORD
BUCKINGHAM
HERTFORD
ESSEX
SURREY
KENT
RIVER THAMES
Miles.
Stanford's Geog.l Estab.t London

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THE STORMS OF JUNE 24TH.

IT may be noticed that this title is very vague—many occurred to us, but there were objections to all—"The Essex Hailstorm" would not do for two reasons, (i.) it would not include the disasters near Luton, Bedfordshire, and (ii.) the damage was not due to hail alone, —true, there was an enormous, an unusual, amount of H, and some of it was extremely large; but the mischief arose from the great strength of the wind, which gave to the H the penetrative energy, which its mere fall by gravity would not have done.

We repudiated the title of "Whirlwind" because we cannot trace any facts which indicate horizontal vortex motion, or the expansion of confined air. The facts would probably fit in with the theory of a revolving storm of which the axis was horizontal. We have tracked H storms which seemed to support such an idea—say that of a monster steam roller passing along, but sometimes resting on the surface, and at intervals lifted above it, so that little injury was done. We objected to the title "Afternoon storm," because all was not quiet till about 8 p.m.

We have had some experience of heavy hailstorms, so that they are not quite such novelties to us as they seem to be to many persons. We can just recollect the London storm of August 1st, 1846, when skylights went, and between three and four inches of rain came through; then in the *Met. Mag.*, Vol. xiv. pp. 97 and 125, will be found details of the severe one at Richmond, Surrey, August 2nd and 3rd, 1879, with one stone $4\frac{1}{2}$ inches long; but before that (we forget the date) we went to Winchmore Hill to see the wreck of one there, and remember three facts—casement windows with the lead knocked out as well as the glass—giant rhubarb stems cut right across—and a poor pony (which had been without shelter in a field) its back all lumps from the pelting which it had suffered—and there are many other cases in our previous volumes.

But we do not remember two instances within a month, of hailstones as large as hen's eggs falling in England, as seems to have been the fact both at Seaford, Sussex, in May, and at Ingatestone, Essex, in June.

At the end of this article we give some very condensed statements as to facts. We hope that this earlier portion is equally trustworthy, but, in order to economize space and to make it easily understood, we have arranged it as a kind of narrative.

The special feature of the early part of June 24th was its high temperature—approaching 90° in the shade. If any one should write a complete memoir of the events of this day, one point to study would be the automatic records of temperature, in order to ascertain the precise time of the sudden fall in temperature, so as to find out whether it was a cause, or a consequence, of the storms.

The earliest record of any disturbance was a shower at Twyford (Berks.), at noon. About an hour later there was a sharp TS, with very large H, at Slough (Bucks.). At 1.30 p.m. large H, L, T, and R were occurring round Uxbridge, Harrow, Stanmore and Pinner. At 1.55 the wind carried away some garden frames at Willesden; at 2.6 the captive balloon from the Royal Botanic Gardens; at 2.45 it carried away a tent a little south of Epping, Essex; at 2.55 it was wrecking Ingatestone; it reached Chelmsford at 3; Danbury at 3.10, and died out south of Colchester before 4 p.m. But this was not all—whether connected with this disturbance, or not, we do not know, probably not,—there was wreckage going on nearly at the same time (about 3.30 p.m.) along a strip of Bedfordshire, between Luton and Biggleswade, being specially bad in the parishes of Henlow and Lilley.

Later in the day, in North Surrey, Hampshire, and other adjoining counties, and along the East Coast, as far as Hull, there were TSS, with short heavy rains.

We should need an entire number to give details of the damage, so we do not make the attempt. Most persons have seen the accounts in the newspapers, and have learned from the statement in the House of Commons by the Minister for Agriculture (The Rt. Hon. W. H. Long, M.P.) that by personally driving through the Chelmsford and Ingatestone district he had been convinced that there was no exaggeration whatever.

His statement is conclusive and needs no support; but we should like to mention that we have been favoured by one of our correspondents with some beautiful photographs (by Duyshart & Co., of Chelmsford) of the damage, and they seem to us to demonstrate beyond dispute our conclusion that wind was as serious a destructive agent as the hail, and that the unusual ruin was the result of their joint action.

One great source of trouble is, that Essex has not had a bad hailstorm for some years, and therefore many of the farmers and nurserymen had given up insuring against injury by hail, and now of course are in dire distress. Not all, however, for we have heard of one man having already had from his Insurance Company a cheque for something over £880. Had all his brethren been equally careful, June 24th would have been a bad day for the companies.

We are aware that this article is not so strictly systematic as we usually try to make our notes, but there have been two great difficulties in the way—(*a*) the enormous amount of information to be epitomized; (*b*) the fact that if all the entries were grouped either chronologically or geographically, the special features as to wind, H and L could not have been brought out. We have, therefore, adopted the following grouping:—*Selections from Correspondence*, arranged nearly in chronological order, and so giving a history of the storms; *Animals and Poultry killed; Damage by Lightning; Hail; Wind.* In these sections the entries are arranged alphabetically, and most of them refer to Essex; but that the damage in Bedfordshire was nearly as serious (though over a smaller area) may as well be proved by a specimen extract:—

Langford.—A terrific storm passed over this village on Thursday week at about four o'clock in the afternoon. The lightning and thunder were not particularly severe, but the wind and hail were most alarming, and have caused sad havoc and loss. Such a storm has not visited this village since 1843. The crops have suffered terribly, wheat and barley being broken about half-way down the straw, and have already started to prematurely ripen. Onions have scarcely a particle of luke left on them, and turnip seed and beans are ruined. Many gardens are wrecked, the vegetables being badly cut, and the fruit stripped from the trees or so badly bruised that it will be of no service. In many cases the bark of the tree is so badly bruised and cut that in all probability the trees will die. A quantity of glass was broken, and a number of young fowls and ducks were killed. Numbers of dead rooks were collected from the fields next day. The hailstones were of enormous size and very irregular in shape, many resembling rough pieces of ice with sharp edges.

Two other subjects have to be mentioned:—First, our sympathy with the sufferers. By all accounts the Essex farmers have been having hard times. The harvest of 1897 promised to make amends. Over about 100 square miles (one-fifteenth of the county) this prospect has been swept away. Granting that over only half that area is there a total loss, it still means 32,000 acres, and putting it even at £3 an acre, it means a loss of about £100,000. We have seen the amount put at more than double that sum, but it will be hard enough to raise even the £100,000 at which we have put it. The Mansion House fund will need all the help it can get.

The other subject not mentioned is the map, on which, though the scale (in order to include the whole path) is necessarily small, the sites of damage are represented with precision, as far as information has reached us. The spaces without damage between Edgware and Epping, and again S.E. of Witham, are, we believe, strictly true.

SELECTIONS FROM CORRESPONDENCE.

Twyford, Haines Hill.—Heavy shower about noon, but it gave only 0·09 in. In the afternoon (about 4.30 to 6 p.m.) a TS brought the total for the day to 0·59 in.—S. M. WEDDERBURN.

Slough, Upton.—Violent TS at 1.15 p.m., several buildings struck and two cottages burned down. Very large H. Total R 1·31 in.
R. BENTLEY, F.R.Met.Soc.

Slough, Upton Park.—The R measured here at 2.15 p.m. was ·20 in.; by 5 p.m. there had been a further fall of ·73 in., and by 6.50 another ·47, total therefore 1·40 in.—HUGH M. BAKER.

Southall.—A little west of this place I found a large elm had been uprooted, and I was told that much large H had fallen.
K. I. MARKS, F.R.Met.Soc.

Uxbridge, Harefield Park.—Very heavy TS in afternoon; the H was not large, but over an inch of R fell in less than 30 minutes; total R 1·70 in.—W. BATCHELOR.

Stanmore, Wealdstone.—A violent TS with H, of which single stones weighed more than an ounce, began about 1.30 p.m., and lasted about an hour, but R continued till 7 p.m. Total 2·30 in. Vegetables much cut in the gardens, and many rooks stated to have been picked up dead. According to reports, the storm was most severe at Wealdstone, severe at Rickmansworth and Stanmore, and slight at Pinner.—G. E. ELAND.

Harrow Weald, Hill House.—Heavy TS with H the size of hazel nuts between 1.30 and 3 p.m. The R in those 1½ hours was 1·84 in., and the total 1.30 to 7 p.m., 2·08 in.—A. CROSSMAN.

Ealing.—About 2 p.m. [1.50 p.m. we believe.—ED.] a storm swept through Ealing, raising clouds of dust of extraordinary volume and density, and doing considerable damage to Jubilee decorations. Two hours later a TS broke with torrents of R. At the Local Board offices the fall in one hour was 1·40 in., and at Perivale 1·78 in.
C. JONES, C.E.

Willesden Green.—At 1.55 p.m. a sudden squall lifted two glass frames, used as roof to a shed, and carried them away as if they had been sheets of paper. Total R 0·34 in.—R. LAMPORT.

Kensworth [Dunstable].—Terrific TS, a tree and a cottage struck; no H, and only 0·05 in. of R.—S. GRACE JONES.

Broxbourne.—T, H and R, total 0·61 in.—G. J. NEWBERY.

West Kensington, Edith Road.—At about 1.30 p.m. we had a sudden dry squall, and my thermograph showed a fall of 15°. About 5 p.m. we had a TS, and at 5h. 14m. 30s. I saw what looked like a large ball of pink fire, burst like a shell upon a house opposite, knocking off part of the gable, dislodging part of the roof and breaking the window.—G. VON U. SEARLE.

Finchley, Etchingham Park.—Frequent T (but not much L) 1 to 7 p.m. Very heavy R, with H rather larger than hazel nuts, 2.5 to 2.20 p.m. Total R 0·65 in.—J. W. SCOTT.

Muswell Hill.—T for some hours in afternoon. Total R 0·32 in.
S. G. ABETHELL.

Camden Square.—Hot in morning, 87°·8 in the shade. At 2h. 0m. 36s. p.m. a sudden strong gust of wind and sudden fall of temperature of 10°, calmer till 2.5, then very rough until 2h. 9m.

No R, L nor T, but in N.W. and N. a thick darkness covering everything. About 3 p.m. T, and thence till 6.16 p.m. L, T and R, but in no wise exceptional. Total R 0·26 in., most of which fell between 5 and 5.45 p.m.—G. J. SYMONS.

Ongar, Abbots Roding Rectory.—Total R 0·75 in.—L. CAPEL CURE.

Chelmsford, Writtle.—We have had a terrific storm here—H, R, L, T and wind. At 11 a.m. the shade temperature was 83°, and the air very oppressive; the storm so cooled the air that at 7.30 p.m. it was only 60°. At 3.3 p.m. there occurred such a storm of wind and H as I had never seen. During the storm we could do nothing but listen to the H smashing the windows, and it and the R pouring into the house. The worst of the storm was soon over, but the R continued till nearly 4 p.m., when I measured 1·42 in. At 4·10 p.m. I collected some of the stones, and measured them; the largest I saw were $1\frac{1}{2}$ inches by 1 inch by $\frac{3}{4}$ in., and they did not melt till 6 p.m.

M. USBORNE.

Chelmsford, Melbourne.—In about 25 minutes during the R and H storm we registered 1·08 in. As the H would not be caught by the funnel of the gauge, I am unable to give total amount. The storm began soon after 3.0 p.m., and came from S.W. Before it reached us, it became very dark, and we could hear the roar of the storm as it approached; then a few hailstones about the size of marbles; then the storm was upon us, with L, and in half-an-hour it was all over, but as we were in the track, windows and crops were almost totally destroyed. The larger hailstones were 2 in. long by $1\frac{1}{2}$ to $1\frac{3}{4}$ in. wide and $\frac{1}{2}$-in. thick.—EDWARD ROSLING.

Wickford, Runwell Hall.—A little R and some H fell here about 3 p.m., but it amounted only to 0·03 in., so that the storm cannot be said to have reached here, in fact, the damaged trees along the road hence to Colchester show that the limit was about 4 miles N., in which direction, and notably over Ingatestone, it was very dark.

HENRY KEMBLE, LT.-COL.

Chelmsford, Spergula.—Total R in 15 minutes, 1·14 in.

J. C. THRESH, M.D., F.R.Met.Soc.

Chelmsford, High Street.—Terrific hailstorm, which came up like an advancing wall of ice. R 1·37 in. in 20 minutes. F. CHANCELLOR.

Braintree, Fennes.—We were about 15 miles N. of the zone of greatest intensity. Distant T at intervals from about 11 a.m. 2–3 p.m., T remarkably continuous and gradually louder. 3 p.m., T and L sharp, when nearest about 1 mile distant. R, a smart shower, no hail, ·09 in. Damage, none.

HENRY S. TABOR, F.R.Met.Soc.

Danbury Rectory, Chelmsford.—At 3 p.m. the storm was travelling from the due West to this hill, accompanied by unusual darkness, vivid forked lightning and a rushing wind, that came along in swirls and eddies rather than in one direct blast. At 3.4 p.m. rain began to fall; at 3.10 p.m. the wind was blowing a hurricane, and huge hailstones were hurled upon us; at 3.15 p.m. (about) the worst was

over; at 3.30 p.m. the storm had passed. My rain gauge measured ·83 during the 26 minutes. I should like to observe that there were no hailstones in the funnel of the gauge when I examined it at 3.30 p.m., though the ground all round was strewn with them. (Diameter of gauge is 5 inches, height from ground 1 ft.) Owing to the velocity of the wind, the hail fell at an unusually acute angle, but why none were in the gauge I do not know. I weighed one of the hailstones, which was an average one of the larger sized ones, and it scaled ½ oz. Almost every pane of glass on the west side of the house was shivered, including a large sheet of plate glass.—J. BRIDGES PLUMPTRE.

Writtle, Little Boyton Hall.—The rainfall here was 1·34 in. We were about 500 yards out of the main hailstorm, and did not get any wind, but a few very large stones and very heavy rain; the 1·34 in. fell in 30 minutes (timed). The lightning was overhead, 10 seconds time between flash and report approximately, but during height of storm the lightning and thunder were absolutely continuous, a fact which those in the middle of the storm could not notice. The R at Writtle was 1·99 in. R. W. CHRISTY.

Hatfield Peverel, Cardfields.—I am very happy to say that Cardfields was only on the outskirts of the storm, though Fairfields (another house on my farm) had 54 windows broken out of a possible 76. The storm was preceded by a dense black cloud, travelling from N.W. to S.E., making it too dark to read, and the hail and rain began at 3.5, and at 3.25 the storm was over and the sun shining brightly, and in the 20 minutes I registered ·92 in. Some of the hailstones which fell at Fairfields were slabs of ice larger than the palm of your hand, and Mr. Edward Corder, of Writtle, told me that he measured one 4½ inches by 3½ inches which weighed 5 ozs. The centre of the storm was apparently Writtle, Blackmore, and that neighbourhood, where the crops are almost entirely destroyed.

ALF. ROSLING.

Maldon.—The storm was not at its worst here. The hailstones were all rounded at the edges, and I think did not exceed half-an-inch in diameter. Hence, we had no broken windows, nor even frame or pit lights, nor was my garden much injured. R 1·12 in., the greater part of which fell in an hour. We are 10 miles from Chelmsford, where thousands of panes of glass were broken, and at Widford and Ingatestone, 5 to 8 miles nearer London, they caught the utmost severity of the visitation. At Chelmsford I saw drawings of some hailstones, taken by Mr. Charles Pertwee, architect, which measured nine-eighths of an inch across and five-eighths in thickness. These specimens had all the appearance of pieces of broken ice, having jagged edges. The L and T were extremely severe, being almost continuous throughout the hour that the storm lasted.

THOS. ISAAC.

Colchester, Lexden.—Very severe TS, but no H. Total R 0·92 in.

S. F. HURNARD.

Ipswich, Bishop's Hill.—Unusually severe TS, but not much H or R.
G. A. BIDDELL, C.E.

Bury St. Edmunds, Westley.—Very heavy TSS; total R 0·97 in., but the storms were very partial, villages within two miles having little or no rain.—R. BURRELL.

Norwich, Brundall.—Much damage by L during a series of TSS, 3 to 6 p.m. R here only 0·07 in.
ARTHUR W. PRESTON, F.R.Met.Soc.

East Molesey, Palace Road.—R in two hours, 4.30 to 6.30 p.m., 1·55 in.—M. S. JENKYNS.

Surbiton, Vronvelin, Lovelace Road.—Between 4.45 and 6.30 p.m. R 1·96 in.—F. J. BARCLAY.

North Surrey.—The following heavy rains occurred on the 24th:—

New Malden (Sewage Works)	1·82 in.
Esher (,, ,,)	2·32 ,,
West Molesey (Chelsea Water Works)	1·96 ,,
Surbiton (,, ,, ,,)	2·12 ,,

F. CAMPBELL BAYARD, LL.M., F.R.Met.Soc.

Pirbright Camp.—A TS with H and R, 5 p.m. to 5.30 p.m.; R 0·93 in.—H. ELWICK.

Marlow.—Sudden squall of violent wind, L, T, H and R, about 6.8 to 6.15 p.m.—W. R. GOWERS, M.D., F.R.S.

Alton, Colmer Rectory.—No storm near here till about 6.30 p.m., and then only distant. At 8.5 p.m. another short and sharp, but neither H nor R remarkable.—T. HERVEY.

Alresford, Swarraton Rectory.—TS with H began in E. at 7 p.m., and worked round by N. to N.W., and by 7.50 p.m. 1·42 in. of R had fallen.—W. L. W. EYRE, F.R.Met.Soc.

ANIMALS AND POULTRY KILLED.

Essex.—The number of birds killed was enormous, and in many districts there will be no shooting. Not only were young birds drowned, but old ones were struck dead by the hailstones. Cases are on record where wood-pigeons, crows, and other birds fell from trees as if shot by guns, with their heads split open by the falling ice.

Galleywood.—Galley Hall, only a few chickens killed.

Little Baddow and District.—Mr. Charles Smoothy, of Old Riffhams Farm, Little Baddow, reports as under:—"I am sorry to say that the storm here was very destructive to game. We picked up three old partridges, and several young, in a field adjoining my house, killed by the hail, evidently while brooding their young. Some of them were cut as if they had been struck by a bullet. From the severity of the storm, which lasted about half an hour, I am sure no birds could live in the open. This storm has killed hundreds. I am afraid that sportsmen will be greatly disappointed in September. Old birds as well as young must have been killed unless they were well

sheltered by fence or wood. There were over 200 fowls killed in the village of Little Baddow.

Margaretting Hall.—One lamb and several chickens killed.

Mundon.—Some young ducks killed by hail.

Stondon.—Halsford Bridge Farm, 12 chickens killed.

" Woolmongers Farm, 50 chickens killed.

" Paslow Wood Common, 10 young turkeys and many chickens killed.

West Hanningfield.—Many chickens killed.

Widford.—Many pheasants killed.

Wigborough.—Nine chickens killed.

Writtle.—Many chickens drowned, two goslings struck dead by hail.

DAMAGE BY LIGHTNING.

Burnham.—Mr. Read's new workshop was struck but not much damaged.

Colchester.—Chimney struck at the Ordnance Stores.

" Mile End Church, roof and clock damaged.

" Mount Cottage, Butt Road, chimney struck.

Ealing, Hanger Hill.—Oak tree struck.

Ingatestone.—Harding's Farm, chimney struck and fell through roof.

Layer de la Haye.—Oak tree struck.

Manningtree.—Brantham Mill struck, but not ignited.

Rochford.—Market Place. Roof of Mr. Ashby's house struck.

" Eastwood. Several trees struck.

" Mr. Bentall's chimney struck and fell through roof.

St. Osyth Priory.—Tower struck and clock stopped.

Wallasea.—Cottage near the schools much damaged.

HAIL.

Barking.—None.

Blackmore.—When the storm broke it caused two horses to bolt with a mowing machine, which was smashed, another pair ran away with a water-cart, knocked down three other horses, and the whole five fell into a ditch in a heap.

Chelmsford.—The hailstones were of various shapes, some globular, some oval, some oblong, some like sections of cylinders, and some exactly like small saucers, the edges resembling white lace, while the centres consisted of transparent ice, bluish in colour. Mr. Charles Pertwee picked up in the garden of his house, Claremont, London Road, two of the cylindrical shaped hailstones, which he found upon measurement to be five-eighths of an inch thick, and one and one-eighth inches across. It seemed as if rain-drops were congealed on the surfaces of the original stones. Mr. Pertwee had more than 200 squares of glass broken.

Chelmsford.—The corrugated iron shed of Messrs. Hodge and Taylor, near the railway, was so riddled by the hail that it looked as if it had been shot at. About 25 sheets of the iron were pierced.

Danbury.—At the Rectory the hail knocked holes in the water-spouts.

Galleywood.—Flattish stones were picked up here measuring two inches square.

Ingatestone.—Mr. Arthur H. Raven says that he picked up one stone which measured 5½ inches round, and another which weighed (at the Post Office) 3½ ounces.

Ingatestone.—At Lee Farm the hail went through the slate roofing.

Ingatestone.—Mill Green Park, twenty-four hours after the hail-storm the stones lay a foot deep on the N.W. side of the house, and one taken up haphazard measured 4½ inches in circumference.

Ingatestone.—Ingatestone Hall. Mr. Coverdale thus relates his own personal experience of the storm:—"I was driving with my son and my coachman, a man named Gray. We had just got up to Mr. Kortright's house when the storm came on. We jumped out of the trap and hastened into the house. The storm descended without the slightest warning, except the blackness. First the hail and rain came down vertically, and then at a sharp angle. Down came the top of a tree at once. My man Gray—how he stood the storm I don't know—managed to get the cob under the sides of the house, and Mr. Kortright, my son, and I went out to try to assist. The hailstones immediately riddled the umbrella which I put up, and beat me back. The pony sustained a cut right down his nose. (This was a jagged wound about 1½ inches in length, and the pony's whole body was covered with lumps about the size of hen's eggs. A pailful of hailstones was gathered out of the trap). My man's chest and arms looked afterwards just as if he had had five minutes with a bruiser. They were discoloured everywhere, and full of bumps. The force with which he was struck by the hailstones may be estimated by the fact that although he was wearing a mackintosh, livery coat, sleeved waistcoat, and shirt, he is black and blue. His tall hat was dented in. My son got a crack on the head through his hat, and there was a bump on his head in a moment as big as a hen's egg."

Ingatestone.—Mill Green. The roof of Mrs. Du Cane's house looked as if some one had gone along and broken the tiles with a hammer.

Kelvedon Common.—Several hailstones were measured by Mr. Brenes, some of them more than 2¼ inches across.

Layer Breton.—Hail as large as walnuts.

Little Baddow.—At Cuckoo's Farm, at 3 p.m., the hailstones were the size of a hen's egg—they smashed a stable window, and so pelted the horse that he nearly went mad; one stone struck a chicken dead at one blow.

Little Baddow.—On Saturday (about 48 hours after they had fallen), Mr. Mecklenburg found in a ditch hailstones which weighed more than half an ounce.

Little Baddow.—Mr. C. Smoothy says that the hail not merely came through his windows, but cut the blinds to shreds. After they

had been lying some time, he measured one 6½ inches in circumference.

Maldon.—A man driving some ladies had on a hard hat, it was cut through in four places by the hail, and the ladies' umbrellas were riddled.

Margaretting.—Mr. Bright reports hailstones 6 inches round.

Margaretting Hall.—Mr. D. Christy said :—"I was on the top of that haystack when the storm broke. The wind blew away the poles and ladders, and there I had to stay! Two trees close to the stack were twisted and blown about to such an extent that I expected them to come down upon the stack every moment. One or two trees were blown down quite close to me, but I did not hear them, owing to the noise of the wind and hail. One of my old men (Cheek), who is of the same age as the Queen, was caught in the storm, and his arms and body were beaten black and blue by the hail. He has been in bed until this morning, unable to get up. Five other men took shelter under a tree, but when they saw a tree on each side of them blown down, they rushed into the open. Two of my horses bolted with a wagon which overturned into a ditch, and we had to take the wagon to pieces before we could get it out again."

Navestock.—Mr. Long measured a hailstone 4½ inches in circumference.

Ongar.—Cattle have been injured by being pelted with the hail, which drove them nearly wild.

Springfield.—A lady was driving her pony cart, the pony was frightened by the hail and bolted (fortunately homewards), the next day the lady found her shoulders and back stiff and sore from the fusillade of hailstones.

Stock.—Mr. Barton was with a cart, the horse, frightened by being hit by the hail, bolted, and the cart was upset, neither horse nor man was hurt by that, but afterwards a hailstone struck Mr. Barton on his felt hat, and through it, raised a large bump. Some of the stones were as large as hen's eggs.

Theydon Bois.—A hailstone was picked up at Birch Hall which measured 3 inches by 1½ inches.

Writtle.—A hailstone cut through a man's hat and inflicted such a gash that it had to be sewn up.

Writtle.—Skeggs Farm. Mr. Milbank says that he was out in the storm, his straw hat was cut to pieces, his arms, back, and head covered with bruises; four days after the storm there were bruises black and green 3 inches square.

WIND.

Abridge.—Storm lasted from 2.45 to 3.30 p.m.; heavy rain; tent blown down.

Blackmore.—At Spriggs' Farm 30 trees were blown down, one was 4½ feet in diameter. A barn 60 feet long was blown down.

Braintree.—No wind.

Great Baddow.—Six elms blown down—four in one group. On

Great Sir Hughes Farm the top was taken off a tree and dropped on a cottage roof, which it broke in.

Ingatestone.—At Harding's Farm 20 large trees uprooted and many others had tops off.

Ingatestone—In Hyde Park about 20 large trees uprooted and 150 broken.

Ingatestone.—Nearly every private house was damaged, not merely the windows but the roofs, and by overthrown trees. At Mill Green a large frame covered with tiffany was whirled over a clump of trees 30 feet high and carried 60 yards.

Ingatestone.—At Jordan's Farm about 300 tiles were blown off.

Ingatestone.—Mr. Howell, baker, was driving his cart; it was blown over and he was bruised from head to foot. [Probably partly by the fall and partly by the hail.]

Mill Green.—At Mr. Du Cane's house all three chimneys down, one fell through the roof on to a bed.

Mountmessing.—Trees uprooted and blown in all directions.

Stock.—Chimney pots were blown off, stacks overturned, roofs carried away, and trees torn up.

West Hanningfield.—A wagon had just been loaded with clover hay; seeing the hail, the horses were taken out to put them into shelter; this had hardly been done when the wagon was blown over.

Writtle.—At Skeggs' Farm a wagon with two tons of hay upon it was blown completely over; the windmill was so much damaged that it is of no further use, and will have the sails removed.

METEOROLOGY IN BELGIUM.

THE June number of *Ciel et Terre* contains, under the title of *L'Observatoire au Parlement*, a very interesting survey of the present state of Meteorology; but we do not like it, it is too humble. Meteorology has won an honoured position in almost every civilized country in the world, and certainly not least in Belgium, though as yet there is in that country no separate meteorological office, and M. Lancaster writes as if he were pleading for one. If his countrymen understood the subject there would be no need to plead, the office would be created forthwith. Moreover, we are further puzzled because M. Lancaster quotes two able speeches in Parliament in favour of separating the Astronomical and the Meteorological branches of the National observatory, so as to create a seperate Meteorological department, and says nothing as to any objections being raised thereto. If opposite views were expressed, we think that they should have been set out, and dealt with in the article. But as far as we can see the arguments are unanswerable, and so, perhaps, by this time all is, as it should be, settled, and Belgium has its *Bureau Météorologique.*

THE RECENT AUSTRALIAN AND INDIAN EARTHQUAKES.

By PROF. J. MILNE, F.R.S.

THE mails which have recently arrived from Australia, bring long accounts of a severe shock which, on May 10th, shattered chimneys, loosened bricks, cracked ceilings and created alarm in South Australia. The vibrations extended eastwards to Victoria and New South Wales, and from the numerous time-observations which were made, it is clear that sufficient material has been collected to determine the centrum from which the shock emanated. From the character of the movement and its effects, as noted in Adelaide, it seems likely that the origin will be found at a distance of 150 or 200 miles to the south of the same, and, therefore, be sub-marine.

The Australian and other colonies require not only seismographs, but the equivalent of the instrument employed in the Isle of Wight; and the reasons they require them are manifold. Had there been instruments of this type in Australia in 1888, when cable communication with the rest of the world was interrupted for a period of 19 days, it would at once have been known that the cause of this interruption was seismic, and not an operation of war, with the result that the calling out of military and naval reserves would, together with other expenses, have been avoided.

Since 1876 the cables connecting Australia and Java have been interrupted at least eighteen times, and on several of these occasions, when two or more cables were broken simultaneously, we know the cause to have been earthquake movements, producing submarine landslides.

The photograms of the unfelt movements throw light upon disturbances often noted in the records of various instruments employed at observatories. They also help us to confirm, extend, correct, and sometimes disprove, ordinary telegraphic information; but their chief value is that they furnish the means of calculating the velocities with which motion is propagated along different paths *through* our earth, which factors throw new light upon the effective rigidity of the globe on which we live.

The Indian earthquake, which recently wrought much havoc in Assam, announced itself in the Isle of Wight before half-past eleven on the morning of Saturday, June 12th. The movement continued for several hours, and the seismogram is the largest I have yet obtained. A record of this disturbance might have been obtained anywhere on the surface of the globe.

In Greenwich mean civil time, the commencement of movement was in the Isle of Wight at 11h. 29m. 10s.; at Edinburgh at 11h. 18m. 0s.; at Strasburg at 11h. 18m. 32s., and at Grenoble at 11h. 28m. 0s. I should estimate the apparent rate at which the preliminary vibrations were transmitted from Assam to Western

Europe, at 7 to 8 km. per second, or that they took *about* 16 minutes on this journey. If this is the case, the primary shock took place in Assam, in Greenwich time, at 11h. 2m. 0s., or 11h. 12m. 0s. a.m. The origin of this disturbance was in the Cherra Hills, about 240 miles N.E. from Calcutta, or on the convexity of the orogenic fold which runs from Burma, in the south, to Eastern Assam, in the north. The great earthquake of 1869 originated in the same region.

Shade Hill House, Newport, I. of Wight.

WINTERS IN BERWICKSHIRE.

[WE have recently been favoured by Mr. W. Hewat Craw, of West Foulden, Berwickshire, with the following table. It seems to us not merely interesting in itself, but suggestive of a guide to winter severity, which would be very useful if adopted generally, and which may even be found so for years when the thermometric records were untrustworthy or non-existent.—ED.]

Note of the time when the Hill stock (black-faced sheep) required to be fed with hay during snowstorms on the farm of Rawburn, Berwickshire, 1883–1897 :—

Winter.	No. of days when haying was needed.	Days between which sheep required hay.
1883—84	—	No hay required; snow did not lie so deep as to prevent the sheep feeding.
1884—85	16	From 10th to 26th January.
1885—86	34	From 25th Jan. to 11th Feb., and from 2nd to 19th March.
1886—87	19	From 10th to 18th January, and from 14th to 25th March.
1887—88	28	From 21st Feb. to 21st March.
1888—89	5	From 1st to 5th March; one hirsel only.
1889—90	—	No hay required; a mild, open winter.
1890—91	10	From 17th to 27th March.
1891—92	—	No hay required.
1892—93	4	From 27th February to 3rd March.
1893—94	—	No deep snowstorms, but changeable, with severe frosts.
1894—95	54	From 10th January to 5th March. Severe winter, with deep snow.
1895—96	—	No hay feeding needed from deep snow.
1896—97	24	In December, 10 days, from 11th to 21st. In Jan. and Feb, 14 days, from Jan. 21st to Feb. 4th.

ROYAL METEOROLOGICAL SOCIETY.

THE last meeting of this Society for the present session was held at the Rooms of the Royal Astronomical Society, Burlington House, on Wednesday afternoon, June 16th, Mr. E. Mawley, F.R.H.S., President, in the chair.

A paper by Mr. R. C. Mossman, F.R.S.E., on "The Non-Instrumental Meteorology of London, 1713–1896," was read by the Secretary. The data were obtained from :—

I. Register kept at Richmond, Surrey, from April 1713 to June 1745, by Mr. George Smith, a Proctor to Queen Anne.*

II. A daily record given in *The London Magazine* from 1747 to 1758.

III. Register printed monthly in the *Gentleman's Magazine*, 1763–1771. The station from November to April was near the north bank of the Thames, just below London Bridge. During the other half of the year, it was situated seven miles west of Hyde Park Corner.

IV. Registers kept by Mr. Thomas Hoy at Kensington, 1771–1774; Muswell Hill, 1775–1782 ; and Sion House, near Kew, 1783–1822.

V. Register kept at Greenwich by Mr. J. H. Belville from March 1st, 1811, to July 7th, 1856.

VI. Daily weather notes from Greenwich Observatory, published in the Registrar-General's *Weekly Return of Births, Marriages, and Deaths*, 1855–1896.

The phenomena tabulated were Thunderstorms, Lightning without Thunder, Mist and Fog, Snow, Hail, Gales and High Winds.

The thunderstorms show an average number of 10 per annum. The maximum was 25 in 1878 and 1880, and the minimum 1 in 1729. The maximum in one month was 12 in June 1726. The annual period is well marked, embracing the six months April to September, during which time 91·5 per cent. of the whole took place. The maximum occurring in July, and the minimum in February.

The total number of fogs was 4,076, an average of 24 per annum. They increase rapidly during September, but the maximum is not clearly defined, the values for October, November and December being practically the same. The minimum is reached in June.

The total number of days with snow was 2,267, an average of 14 per annum.

The snowiest winter was that of 1887–88 with 43 days, while in the winter of 1862–63 there is not a single instance of a snowfall. The greatest number of falls in one month was 17 in January 1814.

The mean date of first snowfall is November 9th; the earliest date being September 24th in 1811; and the latest April 10th in 1834. The mean date of last snow is March 30th, the extreme dates being January 6th, 1894, and May 27th, 1821.

Hail is essentially a spring phenomenon, reaching a maximum in

* See *Met. Mag.*, Vol. xxxi. p. 161.

March and April. The minimum is in July and August. It is probable that most of the cases in summer are falls of true hail accompanying thunderstorms, whereas in spring in nearly every case the substance precipitated is "graupel" or soft hail. The total number of falls observed was 988, equal to an average of 6 per annum.

Mr. C. Harding gave an account of the hailstorm which occurred in the south-west of London on April 27th, 1897. This accompanied a thunderstorm in which the lightning was very vivid. The hail lasted only about 20 minutes, from 6.30 to 6.50 p.m., and in that short space of time the melted hail and rain amounted to about an inch of water. The ground was quite white with hailstones, which in some places remained unmelted the whole of the next day. Much damage was done to fruit trees and shrubs. The paper was illustrated by a sketch-map, shaded to show the area over which hail was observed; extending over a length of about six miles from New Malden to Tulse Hill, and varying in width from about half-a-mile at the S.W. end, to about a mile-and-a-half at the N.E. end, and including Wimbledon, Tooting, Balham, Streatham and Brixton. The stations recording a precipitation of more than an inch were Streatham 1·62 in. and Clapham Park 1·18 in.

THE FROST—EARTH TEMPERATURES & WATER PIPES.

THIS heading does not seem appropriate to Midsummer, but it is only now that the anomaly to which we called attention in April, 1895, has been explained—very unsatisfactorily.

In the *Meteorological Magazine*, Vol. XXX., p. 39, we gave a table of "Earth temperatures at 1 foot in February, 1895," and we made the following remark:—"In the above table the stations are grouped in the order of their mean temperature [for the month] and some results are remarkable. The coldest station, Lowestoft, 29°·0, is within a short walk of the hottest but one, Somerleyton, 33°·8. We believe that the thermometers at both stations have been verified, but think that reverification is desirable."

To-day, June 30th, 1897, we have received the April number of the *Quarterly Journal* of the Royal Meteorological Society, and on page 96 we find the explanation of the whole matter, in the following report by Mr. Marriott. The italics are ours.

"Lowestoft, September 4 [1896]. On comparing the thermometers it was found that the wet had gone up 0°·2. The 1 foot and 2 feet earth thermometers have long tubes surrounded by wooden or metal cases. I had not previously been able to test these thermometers, but on this occasion, with the assistance of Mr. Miller, I succeeded in doing so. *I found that the* 1 *foot thermometer had slipped down its case about* 3° *and was consequently reading much too low.* The 2 feet thermometer was fully 1° too high."

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JANUARY, 1897.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
England, London	47·0	10	23·4	18	39·8	31·7	34·0	93	69·0	16·6	2·05	20	7·3
Malta	66·6	9	39·4	31	60·1	49·1	47·2	82	124·3	32·3	1·05	10	5·6
Mauritius	88·0	18	69·6	31	84·9	74·6	71·1	78	135·7	62·2	6·35	17	7·0
Calcutta	87·7	15	49·0	19	79·8	57·5	53·6	61	140·5	41·2	·04	...	1·6
Bombay	88·8	9	61·1	20	81·1	67·1	63·7	69	134·6	51·2	·01	1	2·0
Ceylon, Colombo	92·2	6	68·0	13	89·2	73·9	71·2	76	152·0	65·0	3·81	8	3·1
Melbourne	102·2	7	46·5	17	74·0	56·2	52·7	68	150·8	38·2	5·46	9	6·0
Adelaide	105·1	30	51·7	24	82·4	59·3	51·3	52	162·6	40·5	·66	4	4·6
Sydney	90·3	22	51·6	18	78·2	64·3	58·4	63	154·8	44·2	2·15	13	4·4
Wellington	81·0	12	45·0	1	71·6	57·8	53·0	66	145·0	35·0	8·05	11	4·1
Auckland	...	...	...	...	...	...	...	...	...	...	...	...	..
Jamaica, Kingston	89·5	18	62·0	12	85·7	66·6	62·6	66	...	...	·02	1	2·6
Trinidad	90·0	5*a*	64·0	3*b*	87·3	67·6	68·4	76	171·0	62·0	·75	11	...
Grenada	87·8	10	70·0	21	82·2	72·5	72·8	83	155·0	...	6·10	20	3·0
Toronto	51·7	3	—7·2	25	29·7	15·6	21·6	87	62·5	— 9·3	1·92	15	8·0
New Brunswick, Fredericton	55·3	5	—18·0	19	24·2	3·8	13·0	75	...	...	3·45	10	4·8
Manitoba, Winnipeg	38·0	1	—38·4	23	8·5	—12·0	...	...	...	...	·89	9	5·2
British Columbia, Esquimalt	51·3	7	22·2	27	42·6	34·6	37·2	93	...	...	5·95	20	8·2

a—and 11. *b*—and 4, 15

REMARKS.

MALTA.—Adopted mean temp. 53°·8, or 1°·0 above the average. Mean hourly velocity of wind 11·6 miles. Average temp. of sea 59°·0. TS on 19th. L on four days. Severe hailstorm on the 23rd, at 1.5 a.m. Hailstones of dense ice, reaching in size to that of a hen's egg, fell for several minutes. Much damage was done to skylights and windows of westerly aspect. Three hundred and twenty panes of glass were destroyed in this College in about five minutes. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·6 above, of dew point 1°·2 above, and rainfall ·94 in. below, their respective averages. Mean hourly velocity of wind 8·4 miles, or 2·8 miles below average; prevailing direction E.S.E. and E. by N. T and L on 13th. L on 1st and 16th, and T on 7 days. T. F. CLAXTON.

CEYLON, COLOMBO.—Lightning was seen on 6th and 7th; thunderstorms occurred on the 24th. ALFRED E. WACKRILL.

Adelaide.—A remarkably cool month. Mean temp. 3°·6 below the average. Rainfall ·19 in. below the average. C. TODD, F.R.S.

Sydney.—Rainfall 1·51 in. below, humidity 9 below, and mean temperature 0°·2 below, their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—On the whole a wet month, with interval of fine warm weather; heavy rain in the middle and at the end of the month, 3·20 in. being recorded on the 15th. Strong N.W. winds prevailed, and gales or high winds on ten days. Earthquake on 14th. R. B. GORE.

TRINIDAD.—Rainfall 1·27 in. below the average of 30 years. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL, JUNE, 1897.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge (Harefield Pk.)	3·84	XI.	Rhayader, Nantgwillt ...	3·10
II.	Dorking, Abinger Hall .	1·66	,,	Lake Vyrnwy	4·29
,,	Birchington, Thor	1·55	,,	Corwen, Rhug	...
,,	Hailsham	2·15	,,	Criccieth, Talarvor	3·18
,,	Ryde, Thornbrough	3·08	,,	I. of Man, Douglas	4·76
,,	Emsworth, Redlands ...	3·06	XII.	Stoneykirk, Ardwell Ho.	4·92
,,	Alton, Ashdell	2·53	,,	New Galloway, Glenlee	4·75
III.	Oxford, Magdalen Col..	2·40	,,	Moniavie, Maxwelton Ho.	4·67
,,	Banbury, Bloxham	2·61	,,	Lilliesleaf, Riddell	3·35
,,	Northampton, Sedgebrook	2·39	XIII.	N. Esk Res. [Penicuick]	4·45
,,	Duddington [Stamford].	2·17	XIV.	Glasgow, Queen's Park..	5·67
,,	Alconbury	1·75	XV.	Inverary, Newtown	6·70
,,	Wisbech, Bank House...	2·03	,,	Oban, The Corran	4·99
IV.	Southend	2·64	,,	Islay, Gruinart School ...	1·67
,,	Harlow, Sheering..... ...	2·53	XVI.	Dollar.....	6·19
,,	Colchester, Lexden	2·62	,,	Balquhidder, Stronvar...	5·74
,,	Rendlesham Hall	2·31	,,	Ballinluig	4·95
,,	Rushall Vicarage	1·92	,,	Dalnaspidal H.R.S.....	5·76
,,	Swaffham	...	XVII.	Keith H.R.S.....	4·99
V.	Salisbury, Alderbury ...	2·93	,,	Forres H.R.S.	2·77
,,	Bishop's Cannings	3·69	XVIII.	Fearn, Lower Pitkerrie..	1·94
,,	Blandford, Whatcombe .	3·96	,,	N. Uist, Loch Maddy ...	1·32
,,	Ashburton, Holne Vic...	3·53	,,	Invergarry.....	2·40
,,	Okehampton, Oaklands.	2·55	,,	Aviemore H.R.S.	3·93
,,	Hartland Abbey	2·36	,,	Loch Ness, Drumnadrochit	3·21
,,	Lynmouth, Glenthorne.	3·10	XIX.	Invershin	1·57
,,	Probus, Lamellyn	1·99	,,	Scourie	...
,,	Wellington, The Avenue	2·35	,,	Watten H.R.S.....	1·02
,,	Wincanton.....	2·78	XX.	Dunmanway, Coolkelure	5·36
VI.	Clifton, Pembroke Road	3·22	,,	Cork, Wellesley Terrace	3·10
,,	Ross, The Graig	3·20	,,	Killarney, Woodlawn ...	4·31
,,	Wem, Clive Vicarage ...	2·38	,,	Caher, Duneske	4·19
,,	Cheadle, The Heath Ho.	3·13	,,	Ballingarry, Hazelfort...	3·52
,,	Worcester, Diglis Lock	2·78	,,	Limerick, Kilcornan ...	...
,,	Coventry, Kingswood ..	2·93	,,	Broadford, Hurdlestown	4·27
VII.	Grantham, Stainby	2·20	,,	Miltown Malbay	...
,,	Horncastle, Bucknall ...	1·68	XXI.	Gorey, Courtown House	2·67
,,	Worksop, Hodsck Priory	2·76	,,	Athlone, Twyford	4·43
VIII.	Neston, Hinderton	2·58	,,	Mullingar, Belvedere ...	4·08
,,	Southport, Hesketh Park	3·28	,,	Longford, Currygrane...	4·68
,,	Broughton-in-Furness ...	7·58	XXII.	Woodlawn	5·21
IX.	Ripon, Mickley.....	3·02	,,	Crossmolina, Enniscoe ..	3·96
,,	Melmerby, Baldersby ...	3·11	,,	Collooney, Markree Obs.	4·74
,,	Scarborough, Observat'y	2·05	,,	Ballinamore, Lawderdale	6·07
,,	Middleton, Mickleton ...	2·74	XXIII.	Warrenpoint.....	6·00
X.	Haltwhistle, Unthank...	3·79	,,	Seaforde..	5·88
,,	Bamburgh	2·50	,,	Belfast, Springfield	5·99
,,	Keswick, The Bank.....	4·38	,,	Bushmills, Dundarave..	5·68
XI.	Llanfrechfa Grange	3·17	,,	Stewartstown	6·71
,,	Llandovery	2·56	,,	Killybegs	8·36
,,	Castle Malgwyn	2·79	,,	Lough Swilly, Carrablagh	5·10
,,	Builth, Abergwesyn Vic.	3·29			

JUNE, 1897.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours. Dpth	Greatest Fall in 24 hours. Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date	Min. Deg.	Min. Date.	No. of Night below 32°. In shade.	No. of Night below 32°. On grass.
			inches.	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	1·87	— ·14	·68	8	11	87·8	24	43·3	10	0	0
II.		Maidstone (Hunton Court)....	...	...	...	...	...	...	...	...	...	...	...
,,		Strathfieldsaye	2·04	...	·92	8	10	...	...	...	...	...	...
III.		Hitchin	2·33	+ ·47	·88	8	13	81·0	23	41·0	18	0	...
,,		Winslow (Addington)	2·55	+ ·69	1·01	8	12	84·0	13	40·0	10	0	0
IV.		Bury St. Edmunds (Westley)	2·94	+ 1·15	·97	24	11	75·0	23	43·0	19	0	...
,,		Norwich (Brundall)	2·23	...	·61	18	14	83·0	24	43·4	19	0	0
V.		Weymouth(LangtonHerring)	2·94	+ ·71	·89	8	9	76·0	25	45·0	17	0	...
,,		Torquay (Cary Green)	...	...	...	...	...	...	...	...	...	...	...
,,		Polapit Tamar [Launceston]..	1·73	— ·48	·44	19	12	78 0	25	41·7	3	0	0
VI.		Stroud (Upfield)	2·44	+ ·05	·72	8	12	80·0	23*b*	45·0	18	0	...
,,		ChurchStretton(Woolstaston)	2·73	+ ·18	·81	8	13	78·0	13*c*	42·0	17	0	0
,,		Tenbury (Orleton)	2·32	— ·30	·66	9	11	83·0	12	42·0	10	0	0
VII.		Leicester (Rotherby Hall) ...	2·05	...	·54	8	14	...	...	...	...	...	...
,,		Boston	1·92	+ ·03	·38	8	12	88·0	23	42·0	21	0	...
,,		Hesley Hall [Tickhill].....	3·03	+ 1·11	1·42	30	16	84·0	13	39·0	10	0	0
VIII.		Manchester(PlymouthGrove)	3·62	+ ·97	·72	1	13	85·0	23	39·0	8	0	1
IX.		Wetherby (Ribston Hall) ...	3·83	+ 1·94	1·14	6	15	...	...	...	...	...	...
,,		Skipton (Arncliffe)	5·38	+ 2·02	·85	19	17	...	...	...	...	...	...
,,		Hull (Pearson Park).	1·57	— ·18	·36	19	10	83·0	12*d*	39·0	10	0	...
X.		Newcastle (Town Moor)	2·82	+ 1·18	·70	18	13	...	...	...	...	...	...
,,		Borrowdale (Seathwaite).....	9·03	+ 2·45	1·90	15	18	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely).....	3·13	+ ·70	·86	8	12	...	...	...	...	...	...
,,		Haverfordwest	3·14	+ ·58	·72	17	16	78·2	23	43·5	3	0	0
,,		Aberystwith (Gogerddan) ...	2·26	...	·49	16	10	83·0	12	33·0	1,2	0	...
,,		Llandudno.....	2·30	+ ·53	·68	17	17	76·2	13	43·4	5	0	...
XII.	SCOTLAND.	Cargen [Dumfries]	3·36	+ 1·41	·92	15	12	75·2	5	38·0	19	0	0
XIII.		Edinburgh (Blacket Place)...	3·99	...	1·00	13	21	73·4	5	36·0	8	0	0
XIV.		Colmonell	5·22	...	1·61	15	21	77·0	13	42·0	8*e*	0	...
XV.		Lochgilphead (Kilmory).....	7·51	+ 4·41	1·69	15	20	...	...	36·0	18	0	...
,,		Mull (Quinish).....	3·28	— ·01	·82	15	19	...	...	...	...	...	...
XVI.		Loch Leven Sluices	4·90	+ 3·15	1·30	16	11	...	...	...	...	...	..
,,		Dundee (Eastern Necropolis)	5·10	+ 3·60	1·45	15	19	71·9	2	39·5	19	0	...
XVII.		Braemar	4·19	+ 2·20	·75	15	18	74·0	29	37·2	1	0	6
,,		Aberdeen (Cranford)	3·80	...	·86	16	16	72·0	28	38·0	6	0	...
,,		Cawdor (Budgate)	3·63	+ 2·23	·89	15	17	...	...	...	...	...	...
XVIII		Strathconan [Beauly]	2·39	— ·10	·74	16*a*	8	...	...	...	...	...	...
,,		Glencarron Lodge.....	3·23	...	·92	22	13	74·7	29	34·8	9	0	...
XIX.		Dunrobin	1·54	— ·48	·41	15	9	70·0	12	41·0	7	0	...
,,		S. Ronaldsay (Roeberry).....	·56	— 1·20	·10	11	12	68·0	29	38·0	7	0	...
XX.	IRELAND.	Darrynane Abbey.....	4·91	...	1·13	19	25	...	...	...	...	...	...
,,		Waterford (Brook Lodge) ...	2·79	+ ·72	·83	8	14	74·0	5,30	41·0	19	0	...
,,		O'Briensbridge (Ross)	3·62	...	·74	8	14	...	...	...	...	...	...
XXI.		Carlow (Browne's Hill)	3·60	+ 1·76	·81	29	15	...	...	...	...	...	...
,,		Dublin (FitzWilliam Square)	3·26	+ 1·60	·66	8	20	73·7	22	43·0	19	0	0
XXII.		Ballinasloe	5·37	+ 3·07	1·38	23	21	71·0	5	43·0	17	0	...
,,		Clifden (Kylemore)	6·77	...	1·32	15	15	...	...	...	...	..	...
XXIII		Waringstown	5·11	+ 3·04	·87	15	21	79·0	5	40·0	18	0	0
,,		Londonderry (Creggan Res.).	6·15	+ 3·73	1·70	15	20	...	...	...	...	...	...
,,		Omagh (Edenfel)	7·41	+ 4·94	1·41	15	21	73·0	5	40·0	18	0	...

+Shows that the fall was above the average ; —that it was below it.

a—and 22. *b*—and 24. *c*—and 23. *d*—and 13. *e*—and 16, 24.

METEOROLOGICAL NOTES ON JUNE, 1897.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail S for Snow.

ENGLAND.

CAMDEN SQUARE.—In some copies of our last number the second figure of the date of the min. temp. in May had disappeared; it should have been not 1 but 13.

ADDINGTON.—Rainfall above the average of ten years. Great range of max. temp. at times, between the 6th and 8th as much as twenty-five degrees, and between the 24th and 25th twenty-two degrees. T on 1st and 24th.

BURY ST. EDMUNDS, WESTLEY.—A hot month with much growing weather. Vegetation made great progress, and the country looked lovely at the close. Remarkable for the heavy TS of the 24th, which though very severe here was very partial, villages within two miles having little or no rain. Distant T on 6th.

NORWICH, BRUNDALL.—The month entered with fine warm weather. The 7th and 8th were very wet and cold, followed by warm weather. A gale of unusual violence for June occurred on the night of the 18th, and TSS on 18th, 24th and 27th. Much destruction was done in Norwich by the storm of the 24th, both to life and property, and buildings were damaged by L on the evening of the 27th, at Blofield, one mile from this station. The max. temp. on 8th, 50°·6, is the lowest recorded in June since 1886.

WEYMOUTH, LANGTON HERRING.—The mean temp. at 9 a.m. is 0°·8 above the average. The hay crops in this neighbourhood are the heaviest that have been known for many years, and the grain crops promise well. There was a severe TS on the 26th, which lasted for more than seven hours, the flashes of L following each other in quick succession. T also was heard on the 24th and 28th. Very high wind on the 18th. Fog on 27th. The rainfall for the first six months of the year, 18·17 in., is with the exception of 1879, when 20·43 in. fell, the heaviest in that period in 23 years, is 45 per cent. above the average for the first half of the year, and nearly three times that of the corresponding period in 1896.

POLAPIT TAMAR [LAUNCESTON].—Generally a fine, very seasonable month. Distant T very frequent during the last week.

STROUD, UPFIELD—Very heavy R from 11 a.m. to 1 p.m. on 1st, ·54 in. falling in the two hours. TS in evening on 26th; heavy TS at night on 28th, with vivid L.

WOOLSTASTON.—A very variable month with repeated and very abrupt changes from sultry heat to cold stormy weather. T on the 6th. Gale on the 18th. Mean temp. 58°·8.

TENBURY, ORLETON.—A fine warm month, with mean temp. about 2°·5 above the average. T on 6th, 24th and 30th.

ROTHERBY HALL.—Total R for first 6 months 11·24 in., against 7·71 in. in 1896.

WALES.

HAVERFORDWEST.—Fine bright hot weather in the first week, followed by nearly a fortnight of broken weather, which was most acceptable to the country, and contributed to the realization of the splendid hay crops, and to every likelihood of a magnificent harvest. Fine, bright, warm weather, with some heavy falls of R at night, closed this most seasonable June. Distant TS on 13th.

ABERYSTWITH, GOGERDDAN.—Bright sun, with S. or S.W. wind, most of the month.

SCOTLAND.

CARGEN [DUMFRIES].—The mean temp. of the month was 1°·5 above the average. The constant and sudden fluctuations of temp. were very remarkable;

on no less than six occasions was there a difference of upwards of 10° in the maximum temp. of succeeding days. The duration of sunshine was greatly below the average. Light winds, mostly easterly, prevailed during the month. Farm crops have hardly ever had a better appearance at this season. Warm weather constantly following R caused luxuriant growth, and corn, hay, and turnip crops promise to be much above the average. T and L on 1st and 29th. T on 2nd and 13th.

EDINBURGH, BLACKET PLACE.—The coldest June since 1888, and the wettest since 1879. The rapid alterations of heat and cold were of frequent occurrence. Fog on six days. TSS on 13th and 14th. Mean temp. on 20th, only 45°·5. Very heavy R at 10 a.m. on 16th, ·44 in. fell in 16 minutes, and the temp. fell till 2.30 p.m., when it was 43°·4.

COLMONELL.—Rain 2·46 in above, and mean temp 0°·5 above, the average of 21 years.

LOCHGILPHEAD, KILMORY.—The wettest month of June remembered, without reference to records; very low temp. also at times.

BRAEMAR.—A dark and wet, but fine growing month.

ABERDEEN, CRANFORD.—Generally cold and cloudy; gale, with R, on 16th, 17th, and 18th.

S. RONALDSAY, ROEBERRY.—A very dry month. Mean temp. 51°·3, being 0°·9 below the average of seven years.

IRELAND.

DARRYNANE ABBEY.—A very wet month, with extremely heavy falls of R for a few hours on 19th and 23rd. On the 19th almost all the fall was between 9 a.m. and 1 p.m., and caused great floods. On 23rd most of the fall was between 9 and 11 a.m. Constant thick mist and fog in the last fortnight.

WATERFORD, BROOK LODGE.—Temperature much below that of last year. Heavy TS on 12th; T and L on 28th. Fog on 27th, 28th, and dense fog on 30th.

O'BRIENSBRIDGE, ROSS.—Remarkable for extreme variations of temp., frequent summer L without T.

DUBLIN.—Although the R and rainy days were in excess of the average, and the amount of cloud was large, June, 1897, must be regarded as a favourable month, conducive to health, and propitious to vegetation. It is remarkable that with a preponderance of easterly and north-westerly winds, the relative humidity was very high, and radiation temperatures by night were not low. There was a cold spell from the 15th to the 20th. Mean temp. 58°·7, or 0°·9 above the average. High winds were noted on seven days, but the force of a gale was attained only on the 16th and 19th. Fogs on seven days. TS on the 12th, and L on 22nd. Solar halos on the 5th and 28th.

BALLINASLOE.—Gales from W. on the night of the 15th and all day on 16th, at night on 17th, and all day on 18th and 19th. L and T and heavy R from 10 to 11.30 p.m. on 22nd and L and T at 8 p.m. on 23rd.

WARINGSTOWN.—The wettest June since observations began in 1861, the next wettest being June, 1879, when 4.54 in. fell.

EDENFEL.—The rainfall (7·41 in.) of the past month has not been equalled in any spring or summer month in 33 years, and during that time has been only twice exceeded in any month of the year, viz., by 7·70 in. in October, 1870, and 7·67 in. in December, 1876. As it came after the turnip sowing and before the hay harvest, but little actual damage has been occasioned, except in the lands adjoining mountain torrents, where in many instances the seeds were washed out of the ground. Vegetation is profuse, but there is quite an ominous paucity of flower on all fruit trees, plants and flowering shrubs. Temperatures have been rather below the average, and everything is nearly a month later than last year. The rainfall of the six months, 23.57 in., is the heaviest yet recorded in that period.